



## Visual Analytics Video

### VisMaster: Visual Analytics—Mastering the Information Age

The VisMaster team has released a video on Visual Analytics. This 7:39 minute video outlines the importance of funding research in this new domain. It discusses and demonstrates the benefit of using computational analysis techniques coupled with interactive visualization tools to address the issue



of massive, dynamic sets of data in fields such as business, banking and health.

The example used to relay the value-add of visual ana-

lytics tools is one of epidemiology. In the video health experts are portrayed with a large amount of information to explore in order to assess the cause of a disease in a region, and possible responses to this disease.

Through the use of visual analytics tools, these experts are able to quickly and easily query their data. With the expert having control of the exploration, they can interact with the query—adding, adjusting and reanalyzing the results displayed on an easy-to-understand visual representation.

The video highlights the many benefits visual analytics tools can provide to decision makers in various fields. These tools can facilitate better monitoring of complex processes, improve the management of large datasets, and provide real-time visual displays of such data. All with the human in charge of the analysis.

For more information on the European project VisMaster, visit: <http://www.vismaster.eu>.

This VisMaster video is available at:

<http://videothèque.inria.fr/videothèque/doc/635>

or on YouTube:

<http://www.youtube.com/watch?v=5i3xbitEVfs>

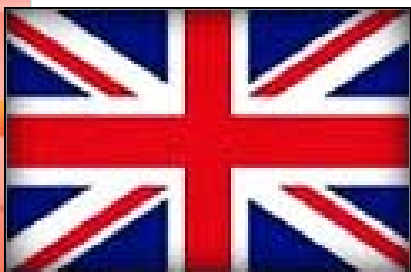
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# Establishing Strong Collaboration with the UKVAC

U.S. Department of Homeland Security (DHS) & National Visualization and Analytics Center (NVAC)

DHS and the UK Home Office have partnered to form the UK Visual Analytics Consortium (UKVAC). Funding for the first year of the UKVAC has been provided by the Basic/Futures Research (BFR) enterprise within DHS. The joint objective is to create a complimentary Visual Analytics activity in the UK by leveraging the work already ongoing in the areas of visual and video analytics at the UKVAC universities. Follow-on funding will be coordinated through the UK Home Office and BFR.



The goal of the UKVAC is to establish a multi-disciplinary scientific community in the area of visual analytics that promotes and advises the visual analytics research and development agenda in the UK.

During the week of March 8th, representatives from the newly formed UKVAC visited with personnel at the National Visualization and Analytic Center (NVAC) in Washington State and then with personnel from DHS, VACCINE and CCICADA during the DHS University Programs Summit in Washington, DC (see UP Summit).

## The Five UKVAC

### Universities include:

- Middlesex University (Lead)
- University College London
- Imperial College
- Bangor University
- Swansea University

Visit with National Visualization and Analytics Center (NVAC)

The UKVAC contingent visited the NVAC on March 8, 2010. Many areas of mutual interest were identified and will likely lead to cooperative efforts, student internships, and collaborative exchanges.

Areas of potential collaboration ranged from the synthetic data produced by the NVAC to the use of Precision Information Environments – another program being funded by BFR at PNNL - in problems spaces such as biology and chemistry.

The synthetic data produced by the NVAC for the

VAST Conference challenges compliments the UKVAC's data generation efforts. Exploring each party's techniques could prove to be greatly beneficial. The UKVAC was encouraged to submit to the 2010 VAST Challenge as a way to better gain familiarity with the intricacies of NVAC's generated datasets.

Both groups expressed interest in collaborating in the development of evaluation methods and procedures for analytical tasks. Members of the UKVAC are also part of VRLink—a group promoting virtual environment busi-



ness communication as a means for real-world business and knowledge exchange. PNNL's work in Precision Information Environments and the NVACTouch appeared to have a strong connection with this virtual reality work, and seems to be an appropriate collaboration point.

Based on these discussions, the NVAC, PNNL, and the UKVAC will initiate collaborations to build on their common interests and develop research programs to better serve a broader user community.

# Optimal Learning for Info Collection Course at Princeton

Command, Control, and Interoperability Center for Advanced Data Analysis (CCICADA)

Identifying the source of a radiation release, finding the best path through a congested city to respond to an emergency, learning the best policy for testing cargo containers and evaluating molecular compounds for converting solar rays for portable energy sources are all examples where information must be efficiently collected. All of them are also applications of optimal learning. Researchers at Princeton University, led by Professor Warren Powell, have developed a powerful new method for guiding this process called the knowledge gradient, which makes it possible to quickly sort through many choices with limited budgets all the

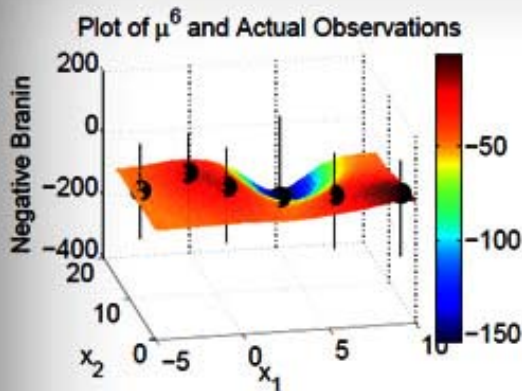
course at Princeton called "Optimal Learning." The purpose of this research is to develop practical tools for guiding the efficient collection of information in laboratory and field environments. The primary goal is to identify good designs and strategies as quickly as possible in the presence of time and budget constraints.

## **Two - Day Workshop on Information Analysis Offered**

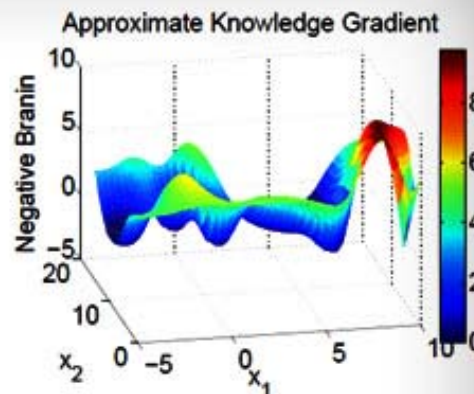
CCICADA and the Statistics Department of Rutgers University will jointly host a two-day workshop titled "Statistical Issues in Analyzing Information from Diverse Sources" on the Rutgers campus on May 6-7, 2010. The workshop will bring together statisticians,

applied mathematicians, computer scientists and policy makers to address issues related to combining information. Professor Jim Berger (Duke University) will provide the keynote address. He will be followed by a group of distinguished speakers from statistics, computer

Knowledge gradient for finding the best of a vector-valued continuous parameter (engineering parameters, searching spatial surfaces,...)



Current belief



Knowledge gradient: marginal value of measuring each parameter setting.

**Project Leader: Warren B. Powell**

while taking advantage of the power of correlated beliefs. Dr. Powell is a member of the Command, Control, and Interoperability Center for Advanced Data Analysis (CCICADA), and this research is the foundation of a new

sciences and machine learning community. The symposium program and registration details will be posted shortly on the CCICADA website <http://ccicada.org/events.html>.

# 4th Annual DHS University Programs Summit

## U.S. Department of Homeland Security (DHS)

The Fourth Annual DHS University Programs Summit—held March 9-11, 2010, in Washington, DC—featured panel presentations, informative sessions, and Federal briefings focused on intelligent resilience in homeland security. Personnel from the Command, Control, and Interoperability (CCI) Division's Basic/Futures Research (BFR) program and the two elements of the CCI Center of Excellence, VACCINE and CCICADA, played a significant role in planning, management and facilitation of panel presentations for the Summit. VACCINE and CCICADA representatives led compelling panels on their respective research in visualization sciences and data sciences.

During the Summit's Student Day on March 9th, BFR Lead and Acting CCI Deputy Director, Joseph Kielman, met with university students participating in Student Day. Student Day was designed to provide an opportunity for students, which DHS-sponsored to attend, to make presentations on their research, attend insightful panels from DHS, federal, and national laboratory employees, and meet with other students and Center of Excellence Directors. March 9th also provided the educational teams of VACCINE and CCICADA an opportunity to lead a panel on Minority Serving Institutions (MSIs) to the education directors of other DHS Centers.

By fostering a collaborative environment, the Summit included plenary session topics detailing how to improve operational resilience, resilient communities, and resilient infrastructures. BFR also hosted meetings with international university partners during this intensive and successful program. For more information on the 2010 Summit, please visit <http://www.orau.gov/dhssummit/>.

### VACCINE & CCICADA MSI Activities

This joint presentation by 8 members of VACCINE and CCICADA highlighted the collaborative research and educational activities of these partner Centers. The RECONNECT Conference, Public Safety Coalition, NAM Mathfest and other workshops were discussed.

As part of this two-panel series on March 9th, the education teams of VACCINE and CCICADA discussed working with MSI schools. They provided general information regarding MSI schools, as well as an overview of the opportunities and challenges of working in the MSI space.

### Innovation Showcase

Staff from the VACCINE and CCICADA Centers were invited to participate in the 2010 Summit's Innovation Showcase, which allowed for University representatives to present on research coming out of their respective Centers.

The Innovation Showcase was open for student researchers from all DHS Centers of Excellence, as well as invited guests on March 9th, and was open to the public on March 10-11. This Showcase provided VACCINE and CCICADA the opportunity to demonstrate visualization and data science tools to other Center researchers, and the broad range of attendees at the Summit.



Plenary sessions at the 2010 DHS University Programs Summit included presentations and discussions detailing how to improve operational resilience, resilient communities, and resilient infrastructures.

Members of the UKVAC attended panels led by the VACCINE and CCICADA Centers to learn more about their research activities. In addition, the UKVAC team was able to meet with VACCINE and CCICADA Center Directors to discuss possible collaborations in the areas of student exchange and curriculum development.

The Director of University Programs, Dr. Matt Clark, also met with the UKVAC team to discuss further collaboration with the VACCINE and CCICADA Centers, and potential funding opportunities as the relationship between the UK and DHS develops further.

The VACCINE session highlighted the investigation and application of visualization sciences to first responder requirements, the efforts of other centers of excellence, and the needs of other homeland security agencies.

**Moderator:** Joe Kielman (DHS)

**Panel Members:** David Ebert (Purdue), Niklas Elmqvist (Purdue), Brian Fisher (SFU), Kelly Gaither (UT), John Gerth (ISIS), Bill Ribarsky (UNCC)

The CCICADA session highlighted the investigation and application of data sciences to first responder requirements and community resilience, the data science needs of other DHS Centers of Excellence and other homeland security agencies.

**Moderator:** Joe Kielman (DHS)

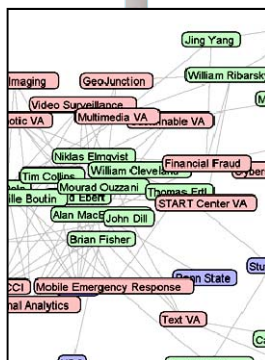
**Panel Members:** Fred Roberts (Rutgers), Hans Chalupsky (ISI), Dan Roth (UIUC), William Wallace (RPI), Abdul-Aziz Yakubu (Howard)

# COE Explorer—Visualizing Visual Analytics

## Visual Analytics for Command, Control and Interoperability Environments (VACCINE)

At the request of the DHS Office of University Programs, researchers at VACCINE are developing the Center of Excellence (COE) Explorer—a multivariate graph-enabled tool that allows for query-driven network visualization of the DHS COE complex.

The tool demonstrates relationships between entities (e.g. home institution, af-



iliation, project membership, co-authorship). Its use will be expanded to include all 12 DHS Centers' people, research, initiatives and partnerships. The final version of the tool will be available through web-based distribution (Java WebStart), allowing for easy access, navigation, query and updates to COE information.

# Extracting Pertinent Information from Text and Images

## Command, Control and Interoperability Center for Advanced Data Analytics (CCICADA)

Raw data of texts and images can be difficult to accurately interpret unless they pass through a "tool." The human eye and brain represent just such a tool by providing a natural, unambiguous format

for interpreting texts and images. In much the same way scientific tools are being developed to filter and improve these interpretative functions of illustrative material.

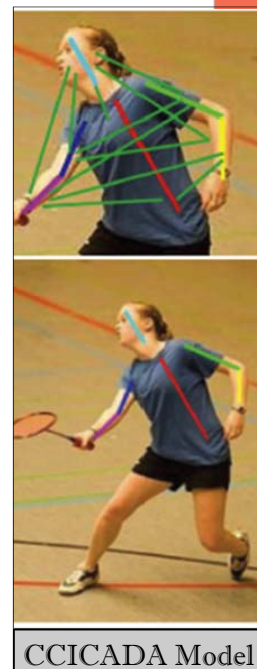
The challenge of developing interpretive tools is being taken up by the Command, Control, and Interoperability Center for Advanced Data Analysis (CCICADA). Led by Professor David Forsyth, researchers at the University of Illinois at Urbana-Champaign are using approximate inference methods, together with structured learning, to produce improved parses of human figures. According to Dr. Forsyth, the research team will use the text found near images together with the images to produce (a) improved interpretations of those pictures and (b) methods to predict interpretations or textual annotations for other images that do not have text. Human parsing is the problem of determining automatically where a person's arms, legs, body and head are in an image. CCICADA researchers are using support vector machine ranking methods to exploit similarity data so that similar objects can be used to train a system to recognize a

particular object.

The breadth and volume of information that is archived and streams across networks needs additional tools for improving filtering and interpretation use in a viable, simple object recognition system. To that end, David Forsyth and his team are developing and revealing methods, which



Standard Model



CCICADA Model

show that human parsing in single images can be significantly improved. Furthermore, this similarity in approach can also produce recognizers that work when there is very little training data.

Command, Control, and Interoperability Center for Advanced Data

## Growing Visual Analytics Interest in Asia

National Visualization and Analytics Center (NVAC)

### Visual Analytics Talk at International Conference

NVAC researcher, Pak Chung Wong gave an invited talk on “Intelligent Visual Interfaces for Text Analysis—Selected Observations and Challenges Ahead” at the ACM International Conference on Intelligent User Interfaces (IUI) conference in Hong Kong. He introduced core science concepts, motivations, and unique aspects of visual analytics and highlighted the science challenges in visual analytics.

IUI is an annual meeting where people interested in Human-Computer Interaction and Artificial Intelligence can connect. The conference is also interested in fields such as psychology, cognitive science, computer graphics and the arts.

For more information on IUI2010, visit: <http://www.iuiconf.org/index.html>.



### Visual Analytics Seminar at Hong Kong University

While in Hong Kong, Pak Wong also presented a seminar on visual analytics to faculty and graduate students at the Hong Kong University of Science and Technology. The seminar was very well received by the audience.

This continued Asian outreach encourages ongoing discussions for the development on a new Pacific VAST Conference in the future.

## Statistical Issues in Analyzing Data from Diverse Sources

Command, Control and Interoperability Center for Advanced Data Analytics (CCICADA)

The Command, Control, and Interoperability Center for Advanced Data Analysis (CCICADA) and the Statistics Department of Rutgers University will jointly host a two-day workshop titled “Statistical Issues in Analyzing Information from Diverse Sources” on the Rutgers campus on May 6-7, 2010. The workshop will bring together statisticians, applied mathematicians, computer scientists and policy makers to address issues

related to combining information. Professor Jim Berger (Duke University) will provide the keynote address. He will be followed by a group of distinguished speakers from statistics, computer sciences and machine learning community. More symposium program and registration details will be posted on the CCICADA website as they become available: <http://ccicada.org/Workshops/DiverseSources/>.

## NVAC's Broadening Educational Program

### National Visualization and Analytics Center (NVAC)

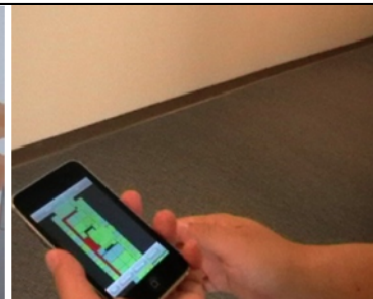
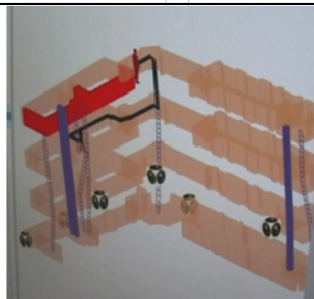
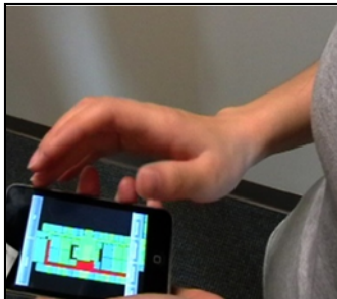
NVAC recently selected interns and fellows for its 2010 educational opportunities. As the science of visual analytics has evolved, there has been not only increased interest from students but also an increase in projects within and outside of NVAC that need individuals with visual analytics skills and experience. Projects outside of NVAC are providing funding for interns as well as their mentors time to support the science of Visual Analytics. This year's candidate pool consisted of 118 applicants. Seven have been presented offers and will begin their assignments in or around May. These individuals range from undergraduates to professors on sabbatical and represent a vast range of universities. Education is paramount to the future of visual analytics, and we believe that we are providing these individuals an invaluable educational experience.



## Mobile 3D Evacuation of Urban Environments

### Visual Analytics for Command, Control and Interoperability Environments (VACCINE)

The VACCINE Center has developed a mobile application supporting situational awareness for emergency response in dense urban environments, including environments with tall and wide buildings. Using a mobile device, an emergency responder can transmit and receive location information, plot 3D



routes between locations, and find alternate routes if there are blocked paths. All this can be done and the results shared among other first responders instantaneously. Thus, emergency responders, as well as the command center, all have situational awareness and comprehensive, personalized routing.

Routing can also be extended from inside a building to the surrounding environment, enabling the system to handle larger scale evacuation along multiple

routes in an efficient manner. As a prototype application, VACCINE has generated 3D graphs for all the academic buildings on the UNC Charlotte campus and embedded them in the street network. This environment

can be used to represent a dense urban neighborhood. VACCINE is also working with

the Charlotte-Mecklenburg Police Department (CMPD) to develop a tabletop exercise using this environment.

This exercise will permit VACCINE to test the system, routing capabilities, and mobile interfaces with real police officers. This will provide valuable feedback and evaluations of the system, which will then be used to improve it. Eventually the improved system will be tested with other police departments and will be deployed with CMPD and others.



## EuroVAST 2010

VisMaster & EuroGraphics

EuroVAST 2010 is the first international symposium on visual analytics science and technology held in Europe. The goal of the symposium is to promote and advance the combination and integration of visualization and analytics

methods for the purpose of problem solving in a variety of application domains (engineering, business, public policy, medicine, security, among others).

EuroVAST will be held on June 8, 2010 in Bordeaux, France, co-located with the annual [EuroVis](#)

[2010](#) Conference.

The EuroVAST program will feature a number of invited speakers from research and industry, as



well as a poster program. Full papers related to Visual Analytics can be submitted to the Visual Analytics track of the EuroVis conference.

EuroVAST is sponsored by the European Coordination Action "VisMaster: Visual Analytics – Mastering the Information Age" in coop-

eration with EuroGraphics.

**Topics of interest include, but are not limited to:**

- Visual representations and interaction techniques
- Data management and knowledge representation
- Data analysis and machine learning
- Cognitive and perceptual aspects
- Infrastructure and Evaluation Applications.

as far as they are related to visual analytics.

For more information, visit: <http://www.vismaster.eu/news/eurovast/>.

## VAC Consortium Meeting in the DC Area

National Visualization and Analytics Center (NVAC)

**Broadening Our Horizons**  
VAC Consortium Meeting—August 31 - September 1, 2010  
University of Maryland

Visual analytics is a rapidly growing field with broad applicability to industry, science, commerce, and society. The VAC Consortium is an active international community of researchers, educators, technology providers and practitioners striving toward a common goal: to help people make sense of complex information effectively with the support of innovative visual analytics software. Come and take part! Join the VAC Consortium 2010 meeting to explore the newest horizons for visual

analytics. Keep abreast of the latest information on the consortium: [http://nvac.pnl.gov/meeting\\_2010/](http://nvac.pnl.gov/meeting_2010/). Have questions? Want to get involved? Contact us at [nvac@pnl.gov](mailto:nvac@pnl.gov).



# VAC Newsletter

Integrated Visualization and Analytics Community



[iVAC@dhs.gov](mailto:iVAC@dhs.gov)

Volume II, Issue III

March 2010

## APRIL 2010

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## JULY 2010

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For more information or to be added to our distribution, email: [iVAC@dhs.gov](mailto:iVAC@dhs.gov)

### Schedule of Events

#### ISCRAM 2010

Seattle, Washington | May 2-5

#### Workshop on Statistical Issues in Analyzing Data from Diverse Sources

Rutgers Univ | May 6-7

#### GeoVA(t) Workshop

Guimarães, Portugal | May 11

#### IVAPP 2010

Angers, France | May 17-21

#### Data Sciences Summer Institute

University of Illinois at Urbana-Champaign  
| May 24 –July 2

#### Advanced Visual Interfaces Conference

Rome, Italy | May 25-29

#### EuroVAST and EuroVis 2010

Bordeaux, France | June 8-11

#### Smart Graphics

Banff, Canada | June 24-26

#### SOUPS

Redmond, WA, USA | July 14-16

#### SIGGRAPH 2010

Los Angeles, CA, USA | July 27-29

#### VAC Consortium

College Park, MD, USA | Aug 31-Sep 1

#### BFR Offsite

College Park, MD, USA | Sep 2

#### VA Summer School

Middlesex Univ, UK | Sep 13-17

#### JIBC Workshop

Vancouver, Canada | Sep 20-22

#### Visual Analytics Workshop

Imperial College, UK | Sep 23-24

#### IEEE VAST

Salt Lake City, UT, USA | Oct. 24-29, 2010